Introduction

The purpose of this in vitro study is to determine the effect of 4 different debonding techniques using 3M ceramic bracket debonding plier, peppermint oil, diode laser and Er:YAG laser on enamel surface, and assess the remnant adhesive on the surface of brackets and to determine the time taken to debond each bracket

Methods

40 human upper premolar teeth were divided into 4 groups with 10 samples on each. Samples were bonded with clarity advance ceramic brackets (3M Unitek) and mounted on color coded acrylic blocks. Group I was debonded with ceramic bracket debonding plier (3M Unitek), Group II with peppermint oil (Falcon essential oils), Group III with diode soft tissue laser (Picasso Lite, Italy), Group IV with Er:YAG, hard tissue laser (Fontona, Slovenia) and time taken to debond each bracket was calculated using stop watch. The debonded samples were examined under stereomicroscope with 10 times magnification and modified ARI score was determined. The samples were prepared for SEM and the images were viewed under 50x and 100x magnifications.

Results

Analysis of variance indicated a significant difference ($P < 0.05$) among the groups. Mean adhesive remnant score between the different groups showed that Group I had a mean value of 3.30± 1.25 which was statistically significant ($p<0.05$) when compared with Group III and Group IV that had a mean mARI of 2.00 ± 0.81 and 1.00 ±0.00 respectively. Group II had a value of 2.40 ± 1.07 which was statistically significant ($p<0.05$) when compared with Group IV with a mean value of

1.00±0.00. Mean time taken for debonding between different groups were statistically significant ($p<0.05$).

Conclusions

The results showed that among the four debonding techniques used to remove the ceramic brackets, Er:YAG laser debonding was the most effective, safest for the enamel surface and was least time consuming.

Keywords

Debonding, ceramic brackets,3M ceramic bracket debonding plier, peppermint oil, diode laser, Er:YAG laser, SEM, Stereomicroscope.